



US009410128B2

(12) **United States Patent**
Rana(10) **Patent No.:** **US 9,410,128 B2**
(45) **Date of Patent:** **Aug. 9, 2016**(54) **METHOD AND COMPOUNDS FOR
GENERATION OF IPSCS**(75) Inventor: **Tariq M. Rana**, San Diego, CA (US)(73) Assignee: **Sanford-Burnham Medical Research
Institute**, La Jolla, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 907 days.

(21) Appl. No.: **13/402,664**(22) Filed: **Feb. 22, 2012**(65) **Prior Publication Data**

US 2012/0213746 A1 Aug. 23, 2012

Related U.S. Application Data

(60) Provisional application No. 61/445,481, filed on Feb. 22, 2011.

(51) **Int. Cl.**

C12N 5/00 (2006.01)
C12N 5/06 (2006.01)
C12N 5/08 (2006.01)
C07H 21/04 (2006.01)
C12N 5/074 (2010.01)
G01N 33/50 (2006.01)
C07H 21/02 (2006.01)

(52) **U.S. Cl.**

CPC **C12N 5/0696** (2013.01); **G01N 33/5073** (2013.01); **C07H 21/02** (2013.01); **C07H 21/04** (2013.01); **C12N 2310/11** (2013.01); **C12N 2310/14** (2013.01); **C12N 2310/141** (2013.01); **C12N 2501/415** (2013.01); **C12N 2501/60** (2013.01); **C12N 2501/602** (2013.01); **C12N 2501/603** (2013.01); **C12N 2501/604** (2013.01); **C12N 2501/606** (2013.01); **C12N 2501/998** (2013.01); **C12N 2503/02** (2013.01); **C12N 2506/00** (2013.01); **C12N 2506/1307** (2013.01)

(58) **Field of Classification Search**

CPC C12N 5/0696; C12N 2501/602; C12N 2501/603; C12N 2501/604; C12N 2501/606; C12N 2506/00; C12N 2506/1307; C12N 2310/11; C12N 2310/14; C12N 2310/141; C07H 21/02; C07H 21/04

USPC 435/325, 357, 366, 375, 377; 536/23.5,
536/24.5

See application file for complete search history.

(56)

References Cited

U.S. PATENT DOCUMENTS

2009/0047263 A1 2/2009 Yamanaka et al.
2010/0120142 A1 5/2010 Impola et al.
2011/0053244 A1* 3/2011 Oyler et al.
2013/0195812 A1* 8/2013 Kikyo et al.

FOREIGN PATENT DOCUMENTS

EP 2 096 169 A1 9/2009
WO WO 2009/152485 A2 12/2009
WO WO 2010/075575 A1 7/2010

OTHER PUBLICATIONS

Bellin et al., 2012, Nature reviews/Molecular Cell Biology, vol. 13, p. 713-726.*
Rezanejad et al., 2012, Cellular reprogramming, vol. 14, No. 6, p. 459-470.*
Li et al., 2014, Journal of Hematology & Oncology, 7:50, p. 1-18.*
Bennett, J., 2003, Gene Therapy, vol. 10, p. 977-982.*
Thomas et al., 2003, Nature Reviews/ Genetics, vol. 4, p. 346-358.*
Kodama et al., 2006, Current Medicinal Chemistry, vol. 13, p. 2155-2161.*
Takahashi et al., 2012, Frontiers in Bioscience, vol. S4, p. 133-141.*
Kaur et al., 2009, Current Gene Therapy, vol. 9, p. 434-458.*
Takahashi et al., 2007, Cell, vol. 131, p. 861-872.*
Moriguchi et al., “The generation of human induced pluripotent stem (iPS) cells from liver progenitor cells by only small molecules and the risk for malignant transformations of the cells”, Academic Collaborations for Sick Children, Oct. 29, 2010, vol. 2, No. 1, pp. 5-9.
International Search Report (ISR) from PCT/US2012/26186.

* cited by examiner

Primary Examiner — Shin Lin Chen

(74) Attorney, Agent, or Firm — DLA Piper LLP (US)

(57)

ABSTRACT

The present invention is based on the seminal concept of combining genomics and chemical biology to identify new agents useful for induced pluripotent stem cell (iPSC) generation. The invention provides a method of generating an iPSC utilizing agents that antagonize a cell specific gene or upregulate expression or activity of a nuclear reprogramming gene, as well as a method of screening for such agents.

12 Claims, 12 Drawing Sheets